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(54) A wheel-bearing for a motor vehicle

(57) In order to obtain a wheel-bearing which is advantageous as regards bulk, weight and method of manufacture, using very simple means, a pin (6) of a first hub part (3) of the bearing is inserted into a bore (8) in a second hub part (4) of the bearing so that a free end of the pin (6) is positioned at a shoulder (4") of the bore, which shoulder (4") is near a second flange (5), whereafter a beading (7) is formed on the free end of the pin (6) so that the beading (7) engages the shoulder (4").

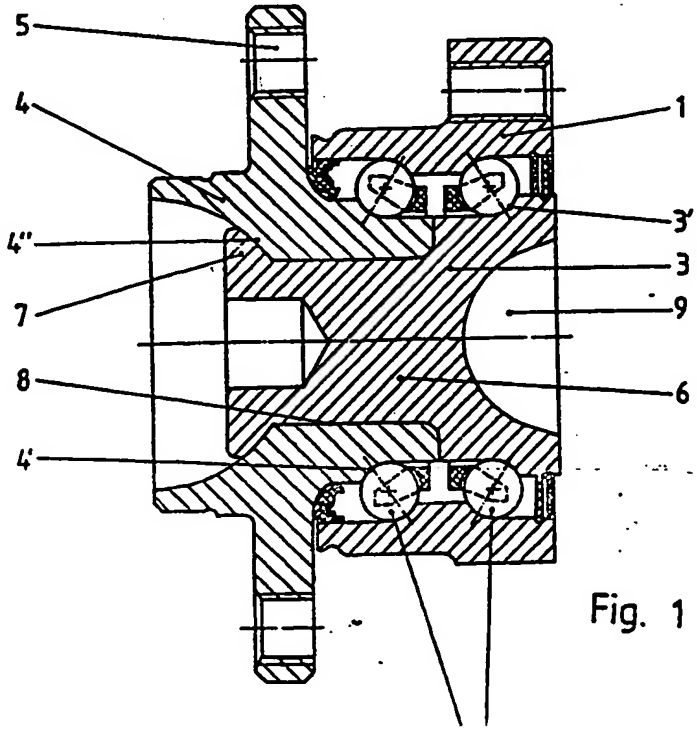

Fig. 1

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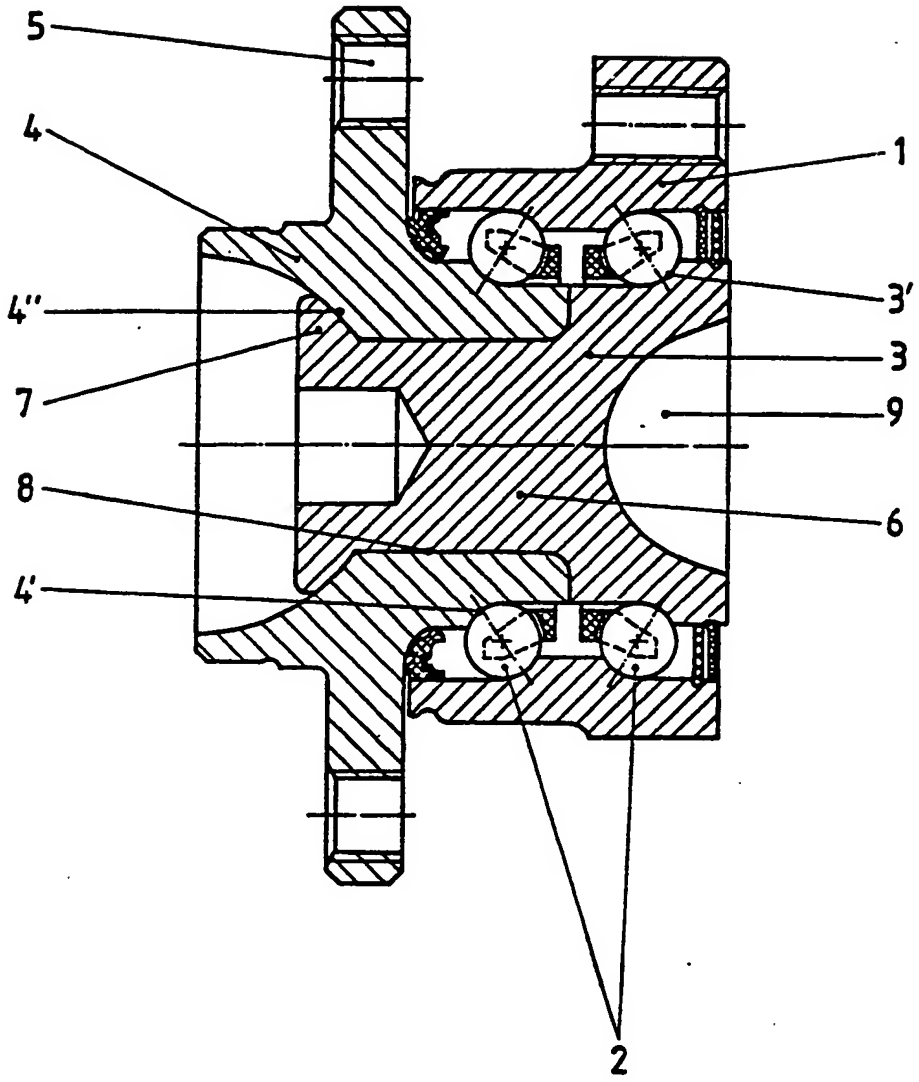

Fig. 1

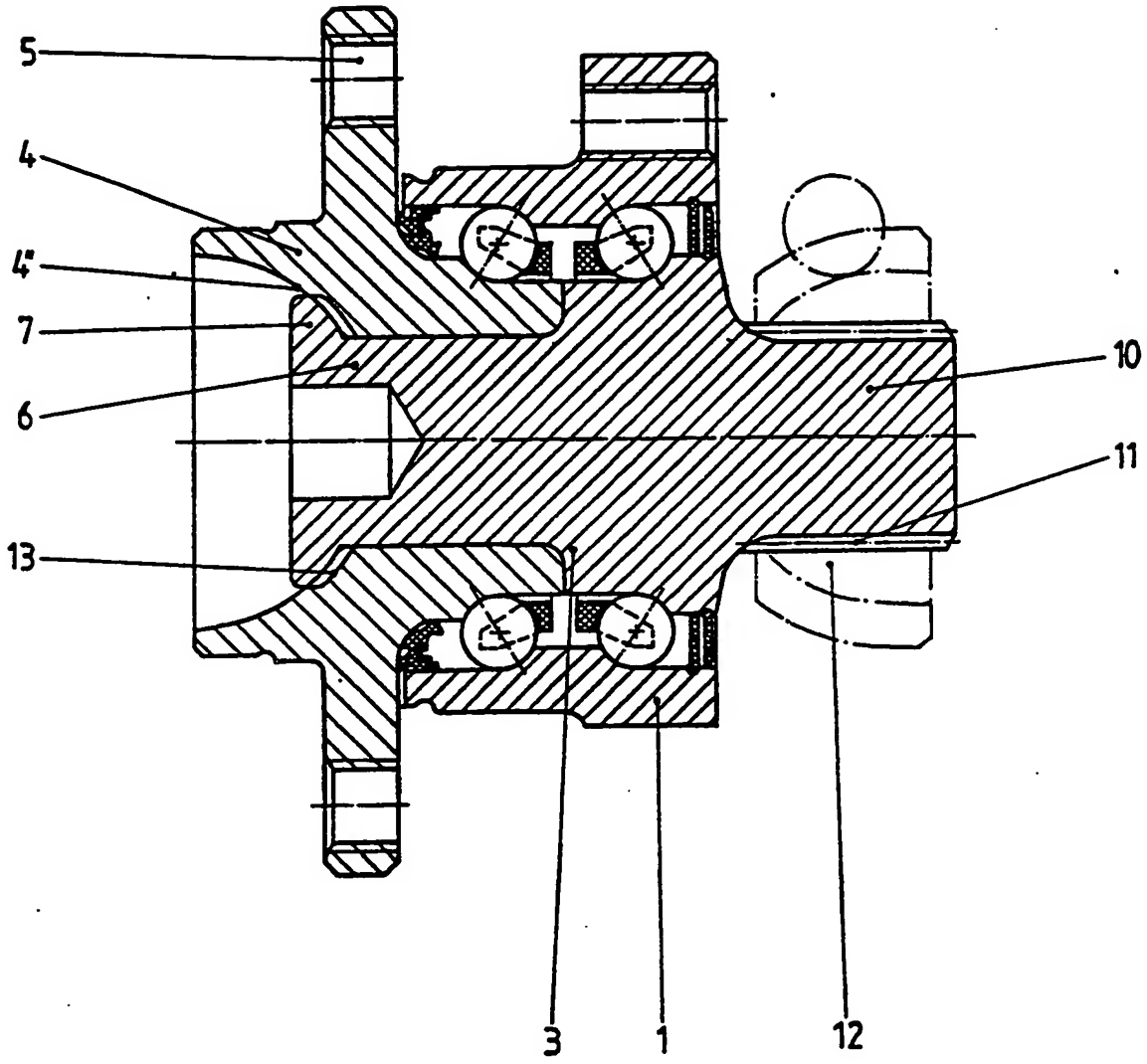

Fig. 2

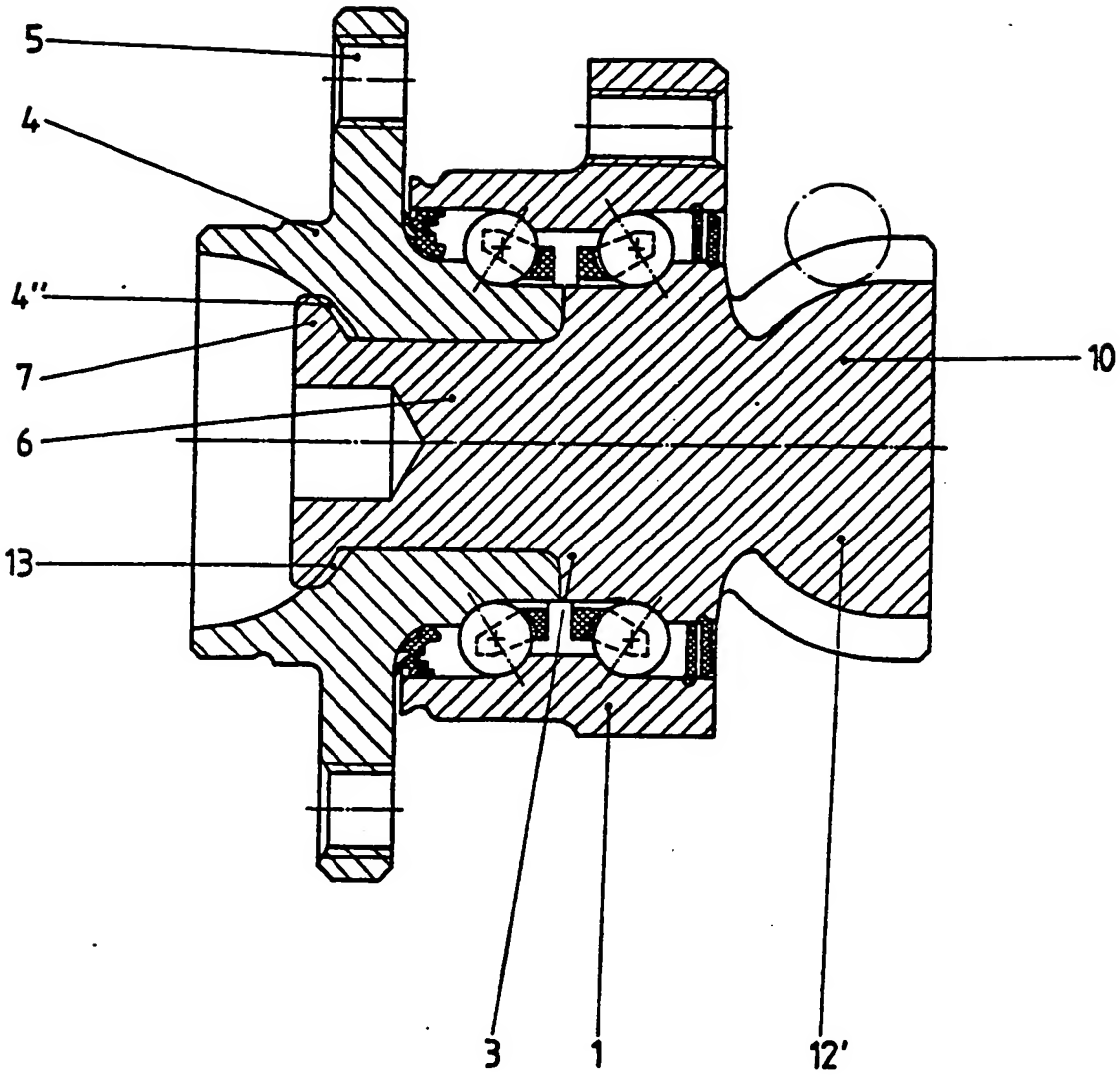

Fig. 3

A wheel-bearing for a motor-vehicle

The present invention relates to a motor-vehicle wheel-bearing comprising an outer ring, a set of two rows of roller members, and a two-part hub, each part of the hub being provided with a respective integral race, and one of the two parts of the hub being provided with a connecting pin extending through a bore in the other of the two parts of the hub, which other part has a securing flange.

A bearing of this kind is disclosed in EP-A-59,339. That bearing has to be axially secured by additional parts which are disadvantageous as regards bulk and weight, since they have to be secured by screws which necessitate a relatively long pin with a threaded portion.

The present invention seeks to provide a remedy.

Accordingly, the present invention is directed to a wheel-bearing having the construction set out in the opening paragraph of the present specification, in which the free end of the connecting pin is formed, after insertion of the pin in the bore, with a beading disposed at a shoulder in the bore of the said other of the two parts of the hub and near the securing flange.

Such a bearing may be constructed as a heavy-duty bearing which is advantageous as regards bulk, weight and method of manufacture, using simple means.

Advantageously, the said one of the two parts of

the hub at an end which is further from the beading has a prolongation. The axial grooves may be formed on the surface of the prolongation or on the surface of the bore. With this arrangement, the inner part of a joint socket may engage the prolongation. Alternatively, the prolongation may be made integral with such an inner part.

The bearing may further have recesses or teeth at the shoulder of the bore.

In addition the bearing may be so constructed that a recess is formed at least at the end face of the said one of the two parts of the hub.

The present invention extends to a method of manufacturing a motor-vehicle wheel-bearing, the bearing comprising an outer ring, a set of two rows of roller members, and a two-part hub, each part of the hub being provided with a respective integral race, and one of the two parts of the hub being provided with a connecting pin extending through a bore in the other of the two parts of the hub, which other part has a securing flange, in which method the free end of the connecting pin is formed, after insertion of the pin in the bore, with a beading disposed at a shoulder in the bore of the said other of the two parts of the hub and near the securing flange.

Preferably, the beading is formed by plastic deformation.

Thus it will be appreciated that a nut and threaded portion on a connection pin of the prior

construction disclosed in EP-A-59,339 may be replaced by a beading, produced by plastic deformation. The beading abuts a shoulder of the bore in the said other one of the parts of the hub near the securing flange, and thus prevents the parts from being disconnected. The resulting pin is short and therefore advantageously light-weight. As regards the pressure exerted on the said other part, which incorporates a race, when the beading is formed such pressure is in the same region as the securing flange, resulting in a very stable section. Consequently the deformation does not have an adverse effect on the precisely ground race of the associated set of roller bearings. The resulting constructional unit is therefore easy to handle and install and can bear high loads since all parts, owing to their compact shape, are easy to manufacture and, since the hub is in two parts, can be equipped with an optimum number of roller members before assembly, so that the load-bearing capacity in this region is also advantageous. In the case of non-driven wheels, therefore, the unit is compact and light.

In spite of this compactness, there may be a long seat surface, which is advantageous as regards loads, between the two hub parts along the connecting pin.

This basic construction can also be modified by simple means for driven wheels, if a prolongation formed with axial grooves on its surface is provided on the said one of the hub parts at an end thereof which is further

from the beading. The prolongation may have a small outer diameter, on which an inner part of a joint socket may be disposed. It is then relatively easy to separate the bearing part from the joint part. This is often desirable, because the two parts may be manufactured in different workshops and are not usually joined until they reach the car manufacturer.

To ensure reliable transmission of torque driven wheels, the said other hub part may advantageously have recesses or teeth at the place where the bore is provided with a shoulder. During manufacture, the beading is at least partly pressed into the teeth, resulting in a positive as well as a frictional connection.

Another possibility of reducing the weight of the bearing is to form a recess in the end-face of the said one hub part. The resulting contour is advantageous for forging and optimum as regards stresses, and can take a heavy load in spite of reduced weight.

Examples of wheel-bearings, for motor vehicles, made in accordance with the present invention are shown in the accompanying drawings, in which;

Figure 1 is an axial section through a non-driven-wheel bearing;

Figure 2 is an axial section through a driven-wheel bearing; and

Figure 3 is an axial section through a modification of the bearing shown in Figure 2.

In Figure 1, a non-driven-wheel bearing comprises an outer ring 1, two rows of balls 2, a first hub part 3 incorporating a race 3', a second hub part 4 incorporating a race 4', and a wheel-securing flange 5 integral with the second hub part 4. In any axial section of the bearing containing a ball centre, a line passing through both contacts between the ball and its associated races is inclined relative to the bearing axis. The first hub part 3 has an integral connecting pin 6 which extends through and fits in a bore in the second part 4, so that the surfaces of the bore and the pin are in contact around the whole circumference of the pin. A beading 7 on the free end of the connecting pin 6 extends behind a shoulder 4'' of the bore in the second part 4, resulting in a simple, compact axial connection to the first part 3. This beading 7 is produced by plastic deformation after the parts 3 and 4 have been fitted together. In the process, forces are exerted on the part 4, but no unacceptable deformation can occur here, since the beading 7 is disposed near the securing flange 5, where the part 4 has high dimensional stability. The stability is also improved by the fact that the parts 3 and 4 have a long seat surface 8 along the connecting pin. Manufacture by forging is simplified in that the first hub part 3 is given a recess 9 in its end face.

Such features can also be advantageous in the case of driven-wheel bearings. Details are shown in

Figures 2 and 3. Figure 2 shows a bearing similar to that shown in Figure 1, except that in Figure 2, in order to transmit a torque, the part 3 has a splined prolongation 10 formed with axial grooves 11 on its surface. The grooves 11 are of help in mounting an inner part 12 of a joint socket (not shown) on the bearing in such a manner as to inhibit relative rotation therebetween. In the modification shown in Figure 3, an inner part 12' of the joint socket is formed integrally with the prolongation 10, thus further simplifying manufacture and assembly.

In both the constructions shown in Figures 2 and 3, teeth 13 are provided at the shoulder 4'' of the bore, so that parts of the beading 7 are pressed into the teeth during the plastic deformation which creates the bearing 7, to provide a positive connection which effects reliable transmission of torque.

Claims

1. A motor-vehicle wheel-bearing comprising an outer ring, a set of two rows of roller members, and a two-part hub, each part of the hub being provided with a respective integral race, and one of the two parts of the hub being provided with a connecting pin extending through a bore in the other of the two parts of the hub, which other part has a securing flange, in which the free end of the connecting pin is formed, after insertion of the pin in the bore, with a beading disposed at a shoulder in the bore of the said other of the two parts of the hub and near the securing flange.

2. A bearing according to claim 1, in which the said one of the two parts of the hub at an end which is further from the beading, has a prolongation.

3. A bearing according to claim 2, in which axial grooves are formed on the surface of the prolongation or on the surface of the bore, so that the bearing is for a driven-wheel.

4. A bearing according to claim 3, in which an inner part of a joint socket engages the prolongation.

5. A bearing according to claim 2, in which the prolongation is integral with an inner part of a joint socket.

6. A bearing according to claim 3 or claim 4, in which recesses or teeth are formed at the shoulder of the

bore.

7. A bearing according to any one of claims 1 to 5 in which a recess is formed at least at the end face of the said one of the two parts of the hub.

8. A motor-vehicle wheel-bearing substantially as described herein with reference to any one of Figures 1 to 3 of the accompanying drawings.

9. A method of manufacturing a motor-vehicle wheel-bearing, the bearing comprising an outer ring, a set of two rows of roller members, and a two-part hub, each part of the hub being provided with a respective integral race, and one of the two parts of the hub being provided with a connecting pin extending through a bore in the other of the two parts of the hub, which other part has a securing flange, in which method the free end of the connecting pin is formed, after insertion of the pin in the bore, with a beading disposed at a shoulder in the bore of the said other of the two parts of the hub and near the securing flange.

10. A method according to claim 9, in which the beading is formed by plastic deformation.